



Learning Centers have been a vision in the making for several years. The goal of these Learning Centers is to facilitate park research to ensure managers can make science-based decisions in resource issues. In 2001, the Natural Resource Challenge included funding for the first five centers to open their doors to scientists, students, and the community. Achievements for the Centers' first year of operation are highlighted here.

Highlights

The Vision Behind Learning Centers



Don McGowan

Students collect beetles during an intensive 24-hour inventory

Learning Centers are places where science and education come together to preserve and protect areas of national significance. Each center will offer a place for researchers to stay, involve the education community in resource management projects, and form concrete partnerships to insure sustainability. Information gathered by researchers will be used by superintendents to make resource decisions and by educators to expand their use of parks to teach science. As a main priority, Learning Centers will also leverage resources to reduce the accumulation of infilled funding requests.

Five pilot Learning Centers were funded for fiscal year 2001. Each of these centers is strategically placed at key areas across the country. The hope is that a system of 32 learning centers nationwide will eventually be established.

National Learning Center Forum

Over 50 people from across the country attended the 2-day National Learning Center Forum held at Point Reyes National Seashore. There was representation at all levels including Denis Galvin-NPS Deputy Director, John Reynolds-Pacific West Region Director, and Nora Mitchell from the Conservation Study Institute. Participants attended from all Learning Centers including those which had received funding and those that were proposed for the following fiscal year. Partners from the Alice Ferguson Foundation, North Cascades Institute, and the Denali Foundation were also present.

This forum was the first opportunity to discuss the common goals of all the Centers. Strategies being used at the new Centers to integrate science, education, and stewardship were presented. Specific research, education, and partnership efforts were also discussed to serve as potential models for all current and proposed Learning Centers.

Natural Resource Challenge

The National Park Service's Action Plan for Natural Resources

The National Park Service (NPS) is undertaking a major five-year action plan to advance the management and protection of natural resources in the National Park System. Called the Natural Resource Challenge (or simply the Challenge), this enterprise is focusing energy, commitment, and resources on the NPS mission to preserve and protect our natural heritage for the American people.



Blair French, University of Alaska Fairbanks

Gathering information on black bears to aid in management decisions.

Learning Center FY01	Location
Purchase Knob: The Appalachian Highlands Science Learning Center	Great Smoky Mountains National Park
Pacific Coast Learning Center	Point Reyes National Seashore
Continental Divide Research and Learning Center	Rocky Mountain National Park
Ocean Alaska Science and Learning Center	Kenai Fjords National Park
Atlantic Learning Center	Cape Code National Seashore

Purchase Knob: The Appalachian Highlands Science Learning Center

At "Purchase Knob: The Appalachian Highlands Science Learning Center" in Great Smoky Mountains National Park, staff are working towards full integration of scientific research and education, where each function works to maximize the other. Currently, the existing house at Purchase Knob is being renovated with offices, a lab space for scientists to process specimens, an activity pavilion and rest rooms for visiting school groups.



Students sampling moss for a Tardigrade Inventory.

Creating Opportunities to Bring Science and Education Together

In the Learning Center's first year of operation, 39 out of 155 permit holders in the Smokies interacted with an educational group. Twenty different scientists were able to extend their stay at the park by spending the night at Purchase Knob.

One remarkable example of an integration of research and education involved Dr. Paul Bartles of Warren Wilson College in Asheville, NC. He is studying Tardigrades (microscopic "water bears") at high elevation sites in the Smokies. Tardigrades can be found living on mosses and lichens. On two of his collecting trips at Purchase Knob, we arranged for a summer camp of at-risk 8th grade students to learn his techniques and assist in collecting Tardigrades.

These 72 students were visibly excited to be involved in "real" science; they had an opportunity to view Tardigrades under microscopes, discovering a world none of them knew existed. One student commented that he was going to be more careful about where he sits now that he knows there are "all those little things everywhere."

All Taxa Biodiversity Inventory Moves Forward

Over 100 scientists in the Smokies are collecting data towards a massive effort to inventory all species of life in the park called the All Taxa Biodiversity Inventory (ATBI). Where feasible, the Science Coordinator and the Education Coordinator at the Learning Center are working to integrate education into this research.

Citizen Scientists

Public participants are also involved in the efforts of the ATBI. "Citizen Scientists" are community members that have been trained in research methods to help forward the Inventory. This program is run by Discover Life in America, the non-profit that operates the ATBI. Currently, 70 volunteers have donated 2,400 hours.

Students Help Collect Research Data

Over 700 students contributed 28,080 hours of research time in Learning Center activities throughout the Park. These students, most in middle and high school, helped discover almost 200 species that are new park records.



Don McGowan

Through inventory and monitoring, students are providing distribution information to park managers on hundreds of more species. In addition, new curriculum is being developed for middle school field trips that will involve participants in monitoring salamander populations, assessing the effects of ozone on plants and inventorying soil micro-invertebrates.

Teachers Updated on Latest Research Methods

Several teacher-training workshops were held including a weeklong seminar in which 24 North Carolina public school teachers were immersed in high elevation research education. A total of 109 teachers received 130 hours of training in research methods to be used in their classrooms.



Students involved in various ATBI activities such as a beetle blitz (above) and searching for Tardigrades extracted from moss samples (left).

NPS Collection

Pacific Coast Learning Center

The recently established Pacific Coast Learning Center at Point Reyes National Seashore is a field station for collaborative research on coastal ecosystems. The center supports coastal research, the accumulation and synthesis of research information, and the transmission of results to managers, students, and the public. To achieve these goals, the field station provides critical office space, housing, computer information systems, laboratory facilities, reference library, and specimen collections to students and scientists.

Outside Research Programs Increase Dramatically

The Learning Center recently helped to increase the number of active research permits at Point Reyes National Seashore by 40% (non-park researchers working in the park increased from 50 to 70 during the first year of the center's operation). It is estimated the Center facilitated over \$500,000 of research by outside organizations. Research permits for all sites within the San Francisco Bay Network are expected to increase as the Research Catalogue and Learning Center website becomes fully developed.

First Jobs for High School Students

Two local high school students spent eight weeks this past summer as Biological Science Aids. These students worked 40 hours a week assisting over a dozen researchers with natural and cultural resource management projects.

They were able to assist with projects such as vegetation transects, water quality sampling, and electro-fishing. In a final report authored by both the students, they commented that this job allowed them to "see a large perspective of what goes on behind the scenes at the park," and it was also "a great chance to see how much time and effort goes into keeping up such a beautiful place."

All Taxa Biodiversity Inventory Begins Development

Learning Center resources are facilitating the early stages of an All Taxa Biodiversity Inventory (ATBI) in Tomales Bay in collaboration with nearly a dozen research groups and individuals. This is a



The historic Hagmaier Ranch has been adapted for use as the Pacific Coast Learning Center.

NPS Collection

community-based endeavor to preserve, protect and restore the ecological integrity of Tomales Bay and raise public consciousness on effective stewardship of coastal lands.

Science Projects

One of the primary goals for The Pacific Coast Learning Center is to facilitate research on coastal ecosystems. With that in mind, the Learning Center has been collaborating with local conservation and fishing groups to propose nearshore marine protected areas. The Learning Center also facilitated several other projects including Snowy Plover monitoring and a joint Spotted Owl research project with Golden Gate National Recreation Area. In all cases, Learning Center resources will leverage non-park resources to perform studies.



NPS Collection

Students document historic fence lines.

Continental Divide Research and Learning Center

The new Center at Rocky Mountain National Park (RMNP) had four goals for 2001:

- 1) increase management related research within the park and network;*
- 2) improve the science information about the park reaching the general public;*
- 3) increase the amount of matching dollars supporting RMNP research;*
- 4) develop a research volunteer program. All four of these goals were achieved and programs are now in place to accomplish even more in fiscal year 2002.*

Matching Dollars Increase Dramatically

During the Learning Center's first year, matching dollars and in-kind contributions for the Rocky Mountain National Park research program soared from ~\$100,000 to ~\$800,000. About \$550,000 was contributed by the Learning Center's partners. An additional \$800,000 was raised to support renovation of the historic McGraw Ranch. The Ranch will provide accommodations for researchers and research volunteers when it opens in 2003.

New Volunteers Recruited through Learning Center

An advertisement in a local newspaper was used to recruit Field Research Assistants for help with an inventory and



Volunteers gathered information on amphibian health.

health study of park amphibians. The ad brought in a dozen new volunteers who enthusiastically looked for frogs and frog eggs in remote streams and lakes. Volunteers also assisted with the first comprehensive survey of glaciers in the park, helped radio tag beaver, and kept an eye on a backcountry study of lake acidification. Volunteers experienced first-hand the ups and downs, literally, of working on field projects in Rocky Mountain's steep terrain. The park benefited from their donated time and from increased community understanding of science-based management. Plans to expand the use of volunteers on research projects in 2002 have been made.

Rocky Research and Resources Day

A one-day mini-science conference was held to educate local residents about issues within Rocky Mountain National Park. Sixty people from surrounding communities attended as researchers reviewed their projects and results. Two such days will be held in 2002.

School Programs Provide Real Life Experience

Two programs initiated through the Learning Center helped students develop a real-life understanding of the scientific method:

■ Sixty high school students participated in a field trip with a researcher who studies the geochemistry of high elevation watersheds.

■ Two high school students enrolled in a National Science Foundation enrichment program were hired as research assistants.



Students studied plant and animal diversity in park meadows.

Historic Archives Protection

Seventeen graduate students from a library science program sorted, cleaned, and annotated historic records as a part of their coursework in a weeklong archives practicum. They were also able to create a database detailing the contents of historic photo albums and repair several rare books. This same course will return to Rocky Mountain next year and will assist Grand Teton National Park.



The Learning Center sponsored a survey of RMNP's glaciers.

Ocean Alaska Science and Learning Center

The Ocean Alaska Science and Learning Center is based in Seward, Alaska at Kenai Fjords National Park and the Alaska SeaLife Center and is a partnership dedicated to understanding and preserving the marine ecosystem connecting Alaska's coastal National Parks through research and education.

Alaska SeaLife Center NMFS permit: 881-1443



Stellar sea lion and research trainer at the Alaska SeaLife Center.

Marine Mammal Declines Studied

Western populations of Steller sea lions are listed as endangered in four of the five National Parks within the Southwest Alaska Network which provide critical habitat for this and other marine mammal species. A large, international, and multi-year research project has begun to investigate the dramatic decline of marine mammals over the past two decades (approximately 80% decrease in Steller sea lions and harbor seals). This project is based at the Alaska SeaLife Center, a core Learning Center partner, where scientists are studying diet, disease, habitat, predator/prey relationships, and toxicity.

Science for Research and Education

■ Researchers from the University of Alaska Fairbanks are trapping and radio collaring black bears to assess habitat use

along the coastline of Kenai Fjords National Park. Students are also able to participate in this research via Project MASTER, a web-based education program that focuses on satellite and radio telemetry research (www.alaskasealife.org/master). Teacher workshops are providing training to optimize the use of this program and to bring marine research into classrooms across Alaska.

■ Remote cameras focused on Steller sea lion colonies send live digital footage to researchers and provide public education. Data collected from these cameras are helping to answer researcher questions about behavioral ecology and provide the public with real-time access to endangered Steller sea lion's lives.

Housing Provided for Researchers

Several researchers studying international Steller sea lion declines were provided housing through the Learning Center. This included a visiting Russian scientist from the Kamchatka Institute of Ecology and Nature, Far East Division Russia Academy of Science.

Learning Center Co-Sponsors National Ocean Science Competition

Every year, high school student teams compete in the National Ocean Science Bowl to showcase their marine knowledge and teamwork skills. The competition includes presenting research papers, answering challenging questions, and participating in a coastal management simulation. The Learning Center co-sponsored the competition this year with the University of Alaska Fairbanks, Institute of Marine Science.



Coastal management team simulation.

National Ocean Science Bowl
Hank Pennington, Pennington Photography

Atlantic Learning Center

The Atlantic Learning Center is a pioneer program of the Highlands Center at Cape Cod National Seashore. The research facility and educational classroom will serve as a cornerstone for the campus and provide a solid science anchor for the envisioned community of artists, educators, and scientists.

Science Program Development

The Atlantic Learning Center (ALC) is currently working to establish partnerships with regional research institutions for project development and future occupants or tenants of the facility. Some of the projects generated from the established partnerships are:

- Brown-tailed moth distribution and ecology, University of Massachusetts
- Lower Cape historic landscape investigation, Harvard University
- Horseshoe crab surveys, University of Rhode Island
- Genetic diversity of coyote populations, Middlebury College
- Gulf of Maine ocean observation system, University of Maine
- Historic landscape investigation, Harvard University



NPS collection

The Atlantic Learning Center facility is the former North Truro Air Force Station.

The ALC is also currently developing a "Research Catalogue" of desired natural resource projects. ALC scientists will work closely with the Inventory and Monitoring (I + M) prototype program to enhance protocol development through interaction and review.

Education Program Development

The Parks as Classroom coordinator has established several educational programs in association with the ALC. The park I + M program has delivered interactive lecture presentations and led field study programs for over 2,400 people from the general public to school groups and educators. The ALC was also associated with three university level field and classroom courses in ecology, geomorphology and mammalogy.

The University of Rhode Island (URI) is currently developing a field biology methods course that will be offered through the ALC in association with park I + M programs.

Facility Progress

Contracts for interior demolition and design for rehabilitation of two buildings at the former North Truro Air Force Station, a visiting researcher wet/dry laboratory, and an educational classroom facility have been awarded. Work is currently underway.

Project Support

- Intel Corporation donated furnishings and laboratory equipment, such as ventilation hoods, stainless steel racks, laboratory work benches, desks, and chairs.
- The National Renewable Energy Laboratory pledged \$25,000 through the Federal Energy Management Program to help design the most sustainable facilities possible.

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